

CLAIMS

What is claimed is:

1. A method for delivering genetic material to a target cell, comprising:
preparing a gene delivery vehicle comprising an expressible nucleic acid molecule encoding a recombinant gene of interest, a virus including a capsid or envelope surrounding said expressible nucleic acid molecule, and a first member of a specific binding pair, said first member of the specific binding pair expressed on an exterior of said capsid or envelope;
coupling a bispecific conjugate to said first member of the specific binding pair to form a gene delivery vehicle complex, said bispecific conjugate comprising a second member of the specific binding pair covalently coupled to a targeting moiety, said targeting moiety adapted for binding to a target molecule associated with a surface of the target cell; and
delivering said gene delivery vehicle complex to the target cell.
2. The method according to claim 1, wherein said first member of the specific binding pair is configured without a specific affinity for said target molecule associated with the surface of the target cell.
3. The method according to claim 1, wherein said first member of the specific binding pair is recombinantly expressed by said gene delivery vehicle.
4. The method according to claim 1, wherein said first member of the specific binding pair comprises an immunoglobulin binding moiety.

5. The method according to claim 4, wherein said first member of the specific binding pair is configured to have binding specificity to a constant region of an immunoglobulin.

6. The method according to claim 5, wherein said second member of the specific binding pair comprises an immunoglobulin.

7. The method according to claim 1, wherein said capsid or envelope is configured to be incapable of binding to the target cell.

8. A kit of parts for delivering genetic material to a target cell, comprising:

a gene delivery vehicle, said gene delivery vehicle comprising an expressible nucleic acid molecule encoding a recombinant gene of interest, a virus including a capsid or envelope surrounding said expressible nucleic acid molecule, and a first member of a specific binding pair;

said first member of the specific binding pair expressed on an exterior of said capsid or envelope; and

a bispecific conjugate configured for coupling to said first member of the specific binding pair, said bispecific conjugate comprising a second member of the specific binding pair covalently coupled to a targeting moiety, said targeting moiety adapted for binding to a target molecule associated with a surface of the target cell.

9. The kit of parts of claim 8, wherein said first member of the specific binding pair comprises an immunoglobulin binding moiety.

10. The kit of parts of claim 9, wherein said immunoglobulin binding moiety is configured for binding to a constant region of an immunoglobulin.

11. The kit of parts of claim 10, wherein said immunoglobulin binding moiety comprises a moiety selected from the group consisting of protein A, protein G, and a Fc receptor.

12. The kit of parts of claim 8, wherein said second member of the specific binding pair comprises an immunoglobulin.

13. The kit of parts of claim 8, wherein said targeting moiety comprises an antibody or a fragment or a derivative thereof.

14. The kit of parts of claim 8, wherein said virus is derived from a virus selected from the group consisting of adenoviruses, adeno-associated viruses, and retroviruses.

15. The kit of parts of claim 8, wherein said target molecule is receptor for which said targeting moiety is a ligand.

16. A gene delivery vehicle, comprising:

a virus having a capsid or envelope;

an expressible nucleic acid molecule encoding a recombinant gene of interest enveloped by said capsid or envelope;

a first member of a specific binding pair recombinantly expressed on an exterior surface area of said capsid or envelope; said first member of the specific binding pair adapted to be coupled with a second member of the specific binding pair, wherein the second member of the specific binding pair is configured as a bispecific conjugate comprising a targeting moiety adapted for binding to a target molecule associated with a surface of the target cell

17. The gene delivery vehicle of claim 16, wherein said capsid or envelope is configured to be incapable of binding to the target cell.

18. The gene delivery vehicle of claim 16, wherein said first member of the specific binding pair comprises an immunoglobulin binding moiety.

19. The gene delivery vehicle of claim 18, wherein said immunoglobulin binding moiety comprises a moiety selected from the group consisting of protein A, protein G, scFvs of an immunoglobulin, and Fc receptors.

20. The gene delivery vehicle of claim 18, wherein said immunoglobulin binding moiety comprises an Fc receptor selected from the group consisting of hFcγRI, hFcγRII, and hFcγRIII.